

AMENDMENTS TO THE CLAIMS

Please amend the claims as indicated below.

1. (Currently Amended) A process for producing polymer moldings (M/T/B) with functional surfaces (O) for which

(I) a coating (B) is produced on a thermoplastic support sheet (T) by a process comprising

(I.1) coating one surface (T.1) of (T) with at least one pigmented coating material (B.1), and

(I.2) coating the resulting film (B.1) with at least one chemically or radiation curable coating material (B.2) to give the film (B.2) that, following its curing, becomes a transparent coating (B.2),

(II) inserting the resulting coated thermoplastic support sheet (~~T/B~~) into an open mold, wherein the coated thermoplastic support sheet (T/B) or the cut-to-size pieces thereof are preformed prior to step (II),

(III) closing the mold and contacting the uncoated side (T.2) of the coated thermoplastic support sheet (T/B) with a liquid polymeric material (M) to shape the coated thermoplastic support sheet (T/B) and join it firmly to the polymeric material (M), and causing the polymeric material (M) to solidify, and

(IV) removing from the mold, the resulting coated polymer molding (M/T/B), whose coating (B) is uncured, part-cured or full-cured;

the coating (B) being covered at least temporarily with a protective sheet (S), wherein the protective sheet (S) is applied to the coating (B) after step (I) and before the coated thermoplastic support sheet (T/B) is preformed

and wherein the protective sheet (S) comprises a layer selected from the group consisting of films made of polyethylene, polypropylene, ethylene copolymers, propylene copolymers, and ethylene-propylene copolymers, and wherein the protective sheet has

(s.1) a storage modulus E' of from 10^7 to 10^8 Pa in the temperature range from room temperature to 100°C ,

(s.2) an elongation at break of from 400 to 900% at 23°C longitudinally and transversely to the preferential direction produced by means of directed production processes in the production of (S),

(s.3) a transmittance $>70\%$ for UV radiation and visible light with a wavelength of from 230 to 600 nm for a film thickness of 50 μm ;

wherein the coating (B)-facing side (S.1) of the protective sheet (S) has

(s.1.1) a hardness <0.06 GPa at 23°C , and

(s.1.2) a roughness corresponding to an R_a value over a sampling area of $50\text{ }\mu\text{m}^2$ of <30 nm as determined by means of atomic force microscopy (AFM),

wherein the film (B.2) is fully or partly cured with UV radiation after step (I), but before step (II), following deformation to adapt the coated thermoplastic support sheet (T/B) to the contour of the mold, wherein the resulting full-cured coating (B.2) is optionally after-cured after step (IV) or the resulting part-cured coating (B.2) is fully cured after step (IV), and the resulting polymer molding (M/T/B) is optionally thermally after-treated to raise the crosslink density of (B.2),

wherein the functionality of the surface (O) of the polymer moldings (M/T/B) is one which imparts at least one of color, effect, electroconductivity, magnetic shielding, inhibition of corrosion, fluorescence, or phosphorescence, and

wherein the polymer moldings are designed for use in a means of transport selected from the group consisting of watercraft, rail vehicles, aircraft, cycles, motorcycles, automobiles, trucks, and buses.

2. (Canceled)
3. (Canceled)
4. (Previously Presented) The process of claim 1, wherein the coating (B)-facing side (S.1) of the protective sheet (S)

(s.1.1) has a hardness <0.02 GPa.
5. (Previously Presented) The process of claim 1, wherein

(s.5) the removal of the protective sheet (S) from the coating (B) requires an averaged force <250 mN/cm.
6. (Canceled)
7. (Previously Presented) The process of claim 1, wherein the side (S.1) of the protective sheet (S) has adhesive properties.
8. (Previously Presented) The process of claim 1, wherein the side (S.2) of the protective sheet (S) that faces away from the coating (B) has antiblocking properties.
9. (Previously Presented) The process of claim 1, wherein the protective sheet (S) is constructed from a plurality of layers.
10. (Previously Presented) The process of claim 9, wherein said layer of the protective sheet (S) is a core layer (KNS) and the protective sheet comprises at least one further layer selected from the group consisting of adhesive layers (KS) and antiblocking layers (AS).
11. (Canceled)

12. (Previously Presented) The process of claim 1, wherein the thickness of the protective sheet (S) is from 10 to 100 μm .

13. (Canceled)

14. (Previously Presented) The process of claim 1, wherein the protective sheet (S) is removed from the coating (B) of the coated, thermoplastic, protective-sheet (S)-covered support sheet (T/B/S) immediately before step (II).

15. (Previously Presented) The process of claim 1, wherein the protective sheet (S) is removed from the coating (B) of the protective sheet (S)-covered polymer molding (M/T/B/S) after step (IV).

16. (Previously Presented) The process of claim 15, wherein the protective sheet (S) is removed from the coating (B) at least one of before or after the coating (B) has been fully cured or before or after the molding (M/T/B) has been after-treated.

17. (Previously Presented) The process of claim 1, wherein the thermoplastic support sheet (T) has a film thickness ≥ 0.5 mm.

18. (Canceled)

19. (Previously Presented) The process of claim 18, wherein the coated thermoplastic support sheets (T/B) or the cut-to-size pieces thereof are adapted to the contours of the molds.

20. (Previously Presented) The process of claim 1, wherein the functionality of the surface (O) of the polymer moldings (M/T/B) is one which imparts at least one of color, effect, electroconductivity, magnetic shielding, inhibition of corrosion, fluorescence or phosphorescence.

21. (Previously Presented) A means of transport comprising the polymer moldings produced by the process of claim 1, wherein the means of transport is selected from the group consisting of watercraft, rail vehicles, aircraft, cycles, motorcycles, automobiles, trucks, and buses.

22. (Canceled)

23. (Previously Presented) The process of claim 1 for producing polymer moldings (M/T/B) with functional surfaces (O), wherein the polymer moldings are exterior mounted components for automobile bodies, and wherein the protective sheet (S) has a thickness of from 10 to 100 μm and is constructed from a plurality of layers, wherein said layer of the protective sheet (S) is a core layer (KNS) and the protective sheet (S) further comprises at least one further layer selected from the group consisting of adhesive layers (KS) and antiblocking layers (AS)

wherein the coating (B)-facing side (S.1) of the protective sheet (S) has

(s.1.1) a hardness of less than 0.02 GPa at 23°C, and

(s.1.2) a roughness corresponding to an R_a value over a sampling area of 50 μm^2 of less than 25 nm as determined by means of atomic force microscopy (AFM).

24. (Previously Presented) The process of claim 23 wherein the film (B-2) is partly cured with UV radiation after step (I), but before step (II), following deformation to adapt the coated thermoplastic support sheet (T/B) to the contour of the mold, and the resulting part-cured coating (B.2) is fully cured after step (IV), and the resulting polymer molding (M/T/B) is optionally thermally after-treated to raise the crosslink density of (B.2).

25. (Previously Presented) The process of claim 23 wherein the film (B-2) is fully cured with UV radiation after step (I), but before step (II), following deformation to adapt the coated thermoplastic support sheet (T/B) to the contour of the mold, wherein the resulting full-cured coating (B.2) is after-cured after step (IV), and the resulting polymer molding (M/T/B) is optionally thermally after-treated to raise the crosslink density of (B.2).

26. (New) A process for producing polymer moldings (M/T/B) with functional surfaces (O) for which

(I) a coating (B) is produced on a thermoplastic support sheet (T) by a process comprising

(I.1) coating one surface (T.1) of (T) with at least one pigmented coating material (B.1), and

(I.2) coating the resulting film (B.1) with at least one chemically or radiation curable coating material (B.2) to give the film (B.2) that, following its curing, becomes a transparent coating (B.2),

(II) inserting the resulting coated thermoplastic support sheet (I/B) into an open mold, wherein the coated thermoplastic support sheets (T/B) or the cut-to-size pieces thereof are preformed prior to step (II),

(III) closing the mold and contacting the uncoated side (T.2) of the coated thermoplastic support sheet (T/B) with a liquid polymeric material (M) to shape the coated thermoplastic support sheet (T/B) and join it firmly to the polymeric material (M), and causing the polymeric material (M) to solidify, and

(IV) removing from the mold, the resulting coated polymer molding (M/T/B), whose coating (B) is uncured, part-cured or full-cured;

the coating (B) being covered at least temporarily with a protective sheet (S), wherein the protective sheet (S) is applied to the coating (B) after step (I) and before the coated thermoplastic support sheet (T/B) is preformed and wherein the protective sheet (S) has a thickness of from 10 to 100 μm , wherein the protective sheet (S) is constructed from a plurality of layers and comprises a core layer (KNS) comprising at least one homopolymer or copolymer selected from the group consisting of films made of

polyethylene, polypropylene, ethylene copolymers, propylene copolymers, and ethylene-propylene copolymers, wherein at least one further layer is selected from the group consisting of adhesive layers (KS) and antiblocking layers (AS), and wherein the protective sheet has

(s.1) a storage modulus E' of from 10^7 to 10^8 Pa in the temperature range from room temperature to 100°C ,

(s.2) an elongation at break of from 400 to 900% at 23°C longitudinally and transversely to the preferential direction produced by means of directed production processes in the production of (S),

(s.3) a transmittance $>70\%$ for UV radiation and visible light with a wavelength of from 230 to 600 nm for a film thickness of 50 μm ;

wherein the coating (B)-facing side (S.1) of the protective sheet (S) has

(s.1.1) a hardness <0.06 GPa at 23°C , and

(s.1.2) a roughness corresponding to an R_a value over a sampling area of $50\text{ }\mu\text{m}^2$ of <30 nm as determined by means of atomic force microscopy (AFM),

wherein the film (B.2) is fully or partly cured with UV radiation after step (I), but before step (II), following deformation to adapt the coated thermoplastic support sheet (T/B) to the contour of the mold, wherein the resulting full-cured coating (B.2) is optionally after-cured after step (IV) or the resulting part-cured coating (B.2) is fully cured after step (IV), and the resulting polymer molding (M/T/B) is optionally thermally after-treated to raise the crosslink density of (B.2),

wherein the functionality of the surface (O) of the polymer moldings (M/T/B) is one which imparts at least one of color, effect, electroconductivity, magnetic shielding, inhibition of corrosion, fluorescence, or phosphorescence, and

wherein the polymer moldings are designed for use in a means of transport selected from the group consisting of watercraft, rail vehicles, aircraft, cycles, motorcycles, automobiles, trucks, and buses.

27. (New) A process for producing polymer moldings (M/T/B) with functional surfaces (O) for which

(I) a coating (B) is produced on a thermoplastic support sheet (T) by a process comprising

(I.1) coating one surface (T.1) of (T) with at least one pigmented coating material (B.1), and

(I.2) coating the resulting film (B.1) with at least one chemically or radiation curable coating material (B.2) to give the film (B.2) that, following its curing, becomes a transparent coating (B.2),

(II) inserting the resulting coated thermoplastic support sheet (I/B) into an open mold, wherein the coated thermoplastic support sheets (T/B) or the cut-to-size pieces thereof are preformed prior to step (II),

(III) closing the mold and contacting the uncoated side (T.2) of the coated thermoplastic support sheet (T/B) with a liquid polymeric material (M) to shape the coated thermoplastic support sheet (T/B) and join it firmly to the polymeric material (M), and causing the polymeric material (M) to solidify, and

(IV) removing from the mold, the resulting coated polymer molding (M/T/B), whose coating (B) is uncured, part-cured or full-cured;

the coating (B) being covered at least temporarily with a protective sheet (S), wherein the protective sheet (S) is applied to the coating (B) after step (I) and before the coated thermoplastic support sheet (T/B) is preformed and wherein the protective

sheet (S) having a thickness of from 30 to 70 μm , wherein the protective sheet (S) is constructed from a plurality of layers and comprises a core layer (KNS) comprising polypropylene and further layers consisting of an adhesive layer (KS) and a thermoplastic antiblocking layer (AS), and wherein the protective sheet has

(s.1) a storage modulus E' of from 10^7 to 10^8 Pa in the temperature range from room temperature to 100° C,

(s.2) an elongation at break of from 400 to 900% at 23° C longitudinally and transversely to the preferential direction produced by means of directed production processes in the production of (S),

(s.3) a transmittance >70% for UV radiation and visible light with a wavelength of from 230 to 600 nm for a film thickness of 50 μm ;

wherein the coating (B)-facing side (S.1) of the protective sheet (S) has

(s.1.1) a hardness <0.06 GPa at 23° C, and

(s.1.2) a roughness corresponding to an R_a value over a sampling area of 50 μm^2 of <30 nm as determined by means of atomic force microscopy (AFM),

wherein the film (B.2) is fully or partly cured with UV radiation after step (I), but before step (II), following deformation to adapt the coated thermoplastic support sheet (T/B) to the contour of the mold, wherein the resulting full-cured coating (B.2) is optionally after-cured after step (IV) or the resulting part-cured coating (B.2) is fully cured after step (IV), and the resulting polymer molding (M/T/B) is optionally thermally after-treated to raise the crosslink density of (B.2),

wherein the functionality of the surface (O) of the polymer moldings (M/T/B) is one which imparts at least one of color, effect, electroconductivity, magnetic shielding, inhibition of corrosion, fluorescence, or phosphorescence, and

wherein the polymer moldings are designed for use in a means of transport selected from the group consisting of watercraft, rail vehicles, aircraft, cycles, motorcycles, automobiles, trucks, and buses.